

## 05–250 Removal and installation of valve springs

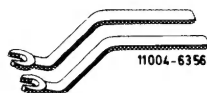
Valve clearance	engine cold (approx. 20 °C)	engine hot (60 °C ± 15 °C)
Intake	0.10 <sup>1)</sup>	0.15 <sup>1)</sup>
Exhaust	0.30	0.35

<sup>1)</sup> 0.05 mm greater for steady ambient temperatures below –20 °C.

Tightening torques	Nm	(kpm)
Bolts for cylinder head cover (engine 615)	5	(0.5)
Nuts for cylinder head cover (engines 615, 616, 617.91)	15	(1.5)
Rocker arm bracket to cylinder head	38	(3.8)

### Special tools

Valve adjusting wrench 14 mm (two)



615 589 00 01 00

Holding wrench for valve spring cap



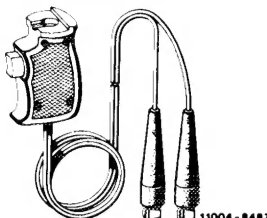
615 589 00 03 00

Socket 27 mm, 1/2" drive  
to crank engine



001 589 65 09 00

Remote starter switch for cranking  
engine (individual component of  
compression pressure recorder 001 589 46 21 00)



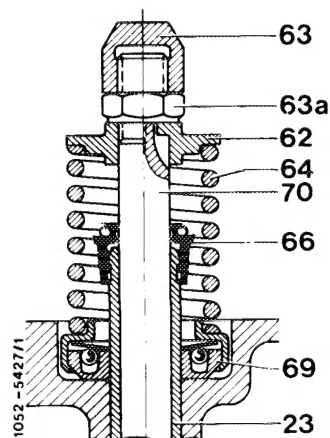
001 589 46 21 08

### Note

Each valve has a valve spring (64) and a Rotocap (69).

On engines with high mileages it is advisable to replace  
the Rotocaps at the same time

- |                     |                     |
|---------------------|---------------------|
| 23 Valve guide      | 66 Valve steam seal |
| 62 Valve spring cap | 69 Rotocap          |
| 63 Cap nut          | 70 Valve            |
| 63a Lock-nut        |                     |
| 64 Valve spring     |                     |



Up-rated engines have stronger valve springs (05—260).

The valve spring as per part No. 180 053 06 20 must not be used in these engines.

In contrast, normal power engines will also accept the valve spring as per part No. 615 053 01 20 from the up-rated engines.

#### **Marking:**

Valve spring, part No. 180 053 06 20, two green or violet-green dots.

Valve spring, part No. 615 053 01 20, two yellow or violet-yellow dots.

Replace any damaged cap nut (63).

The cap nuts are available in three versions:

#### **1st version**

Cap nut with small contact surface (A).

#### **2nd version**

Cap nut thicker and larger at top (B).

#### **3rd version**

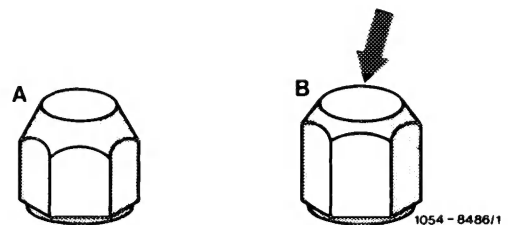
Cap nut thicker at top and hard chrome-plated.

Marking: Silver-colored.

Engines with chilled casting camshafts and hard-backed rocker arms require the version with hard chrome plating.

Cap nuts with hard chrome plating may also be used in engines which have tempered camshafts and rocker arms with induction-hardened and hard chrome-plated surfaces.

In future, the Esslingen-Mettingen spare parts division will supply only the version finished in hard chrome plating.



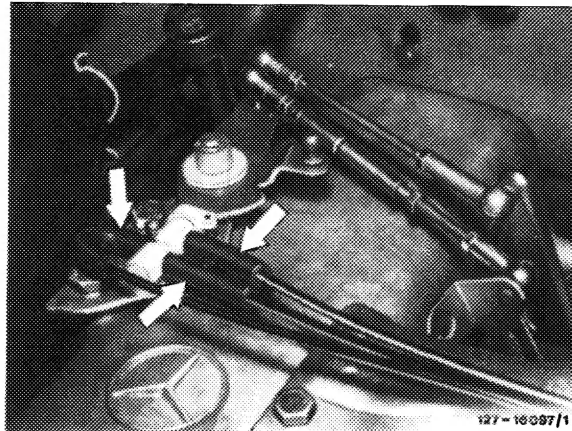
## Removal

### 1 Remove cylinder head cover.

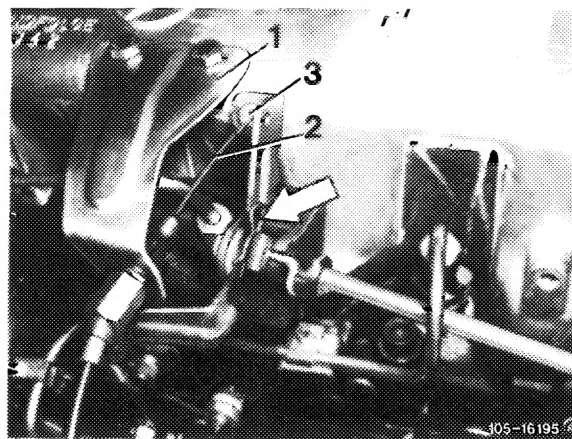
On vehicles with automatic transmissions and vacuum-controlled modulating pressure, additionally disconnect vacuum lines at switch-over valve.

#### Caution:

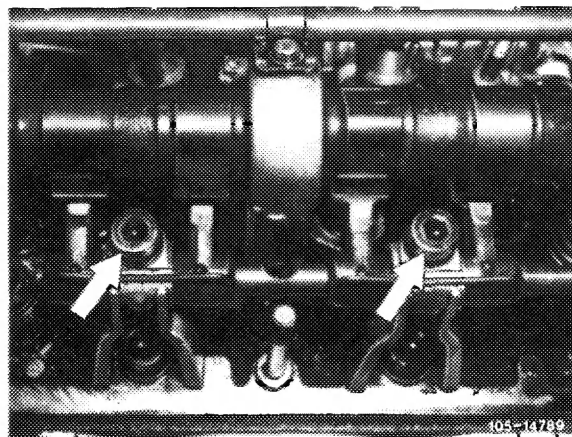
Be sure not to cross vacuum lines. The pipe unions and vacuum lines are color coded.



On engines with longitudinal control spindles, detach all control rods. Withdraw retainer (arrow) and force longitudinal control spindle in aft direction. Unscrew bracket (1) and unclip idle control cable (2) with plastic sleeve (3).

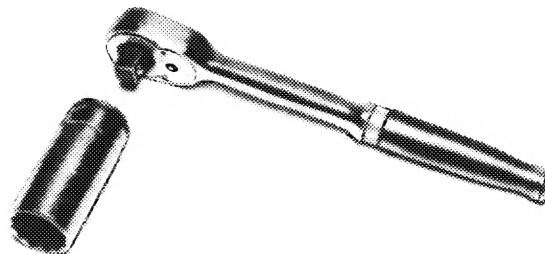


### 2 Remove rocker arms and rocker arm brackets (05-235).

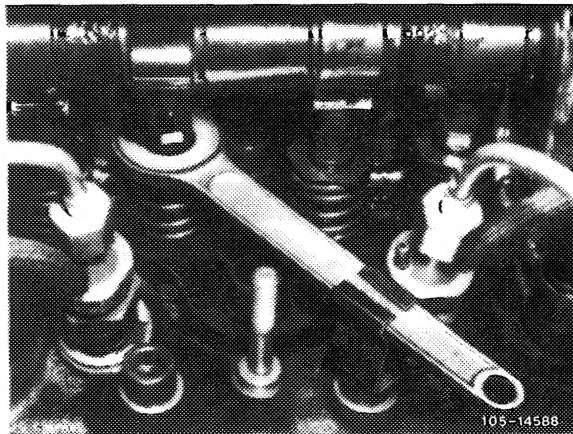


### 3 Turn piston of wanted cylinder to TDC.

Using tool combination, turn crankshaft for this purpose.



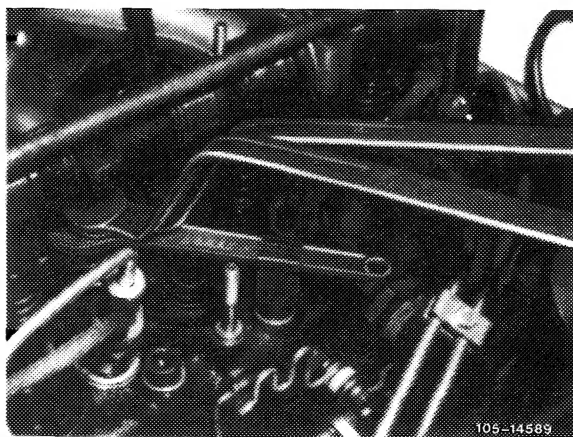
- 4 Apply holding wrench to valve spring cap.



- 5 Unscrew cap nut (63), using valve adjusting wrench.

For this purpose secure lock-nut (63a) with second valve adjusting wrench.

- 6 Unscrew lock-nut (63a).



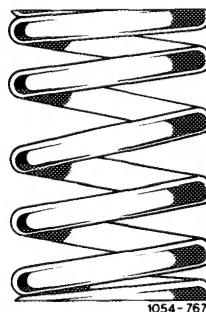
- 7 Remove valve spring cap and valve spring.

- 8 Check valve spring, replacing according to condition (05-260).

## Installation

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- 9 Insert valve spring so that tighter turns are pointing towards cylinder head (dots at top).



10 Fit valve spring cap.

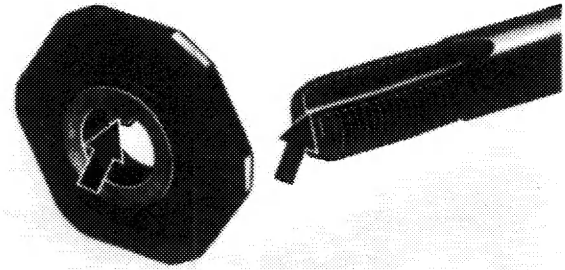
Lug on valve spring cap (arrow) must rest in valve stem groove.

11 Put lock-nut and cap nut on.

12 Install rocker arms and rocker arm brackets (05-235).

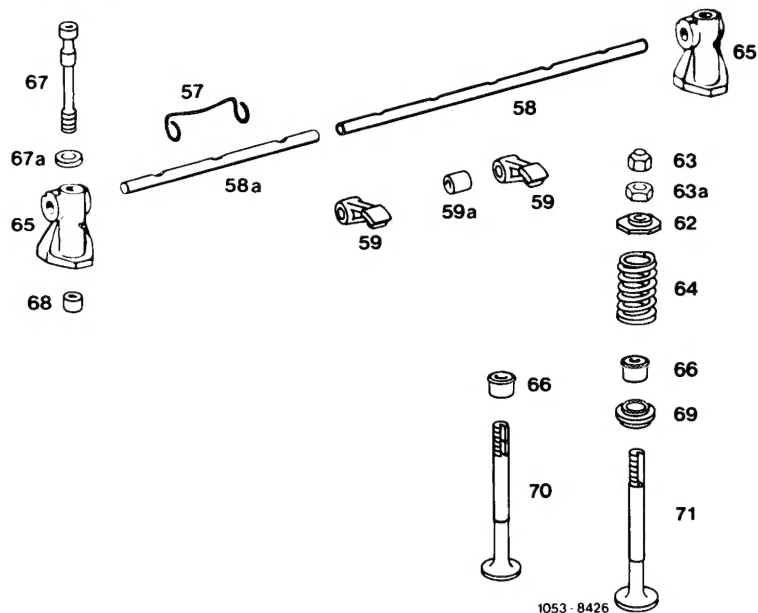
13 Adjust valve clearance (05-210).

14 Fit cylinder head cover.



105-15741

### Valve timing



1053-8426

- |                        |                     |
|------------------------|---------------------|
| 57 Tension spring      | 65 Bearing bracket  |
| 58 Rocker shaft        | 66 Valve stem seals |
| 58a Rocker shaft       | 67 Bolt             |
| 59 Rocker arm          | 67a Washer          |
| 59a Rocker arm bushing | 68 Locating sleeve  |
| 62 Valve spring cap    | 69 Rotocap          |
| 63 Cap nut             | 70 Intake valve     |
| 63a Lock-nut           | 71 Exhaust valve    |
| 64 Valve spring        |                     |